

WHAT IS CLAIMED IS:

1. A thermoelectric element, comprising:

a thermoelectric semiconductor group having N type  
5 thermoelectric semiconductors and P type thermoelectric  
semiconductors;

heat absorbing electrodes joined to one end part of said  
thermoelectric semiconductor group;

heat radiating electrodes joined to the other end part of  
10 said thermoelectric semiconductor group so that at least parts of  
said N type thermoelectric semiconductors and said P type  
thermoelectric semiconductors are alternately connected in series;  
and

heat transmitting members integrally provided to respective  
15 said heat absorbing electrodes and said heat radiating electrodes,  
disposed to be in contact with a cooling medium and having a function  
of radiating heat to said cooling medium.

2. A thermoelectric element according to claim 1,

wherein said heat absorbing electrodes are attached to an  
20 object to be cooled to be electrically insulated, and heat of said  
object to be cooled in a state in which said thermoelectric element  
is not energized is radiated to said cooling medium via said heat  
absorbing electrodes and said heat transmitting members.

3. A thermoelectric element according to claim 1,

25 wherein said heat transmitting members provided at said heat  
absorbing electrodes are attached to an object to be cooled to be  
electrically insulated, and have a function of directly radiating  
heat to said cooling medium and a function as part of said heat absorbing

electrodes in combination, and heat of said object to be cooled in a state in which said thermoelectric element is not energized is radiated to said cooling medium via said heat transmitting members.

4. A thermoelectric element according to claim 1,  
5 wherein in said heat transmitting member provided at said heat absorbing electrode, a region for radiating heat to said cooling medium exists at a position far from a cooling surface of said thermoelectric semiconductor group seen from an object to be cooled.

5. A thermoelectric element according to claim 1,  
10 wherein in said heat transmitting member provided at said heat absorbing electrode, a region for radiating heat to said cooling medium exists between an object to be cooled and a cooling surface of said thermoelectric semiconductor group.

6. A thermoelectric element, comprising:  
15 a support member;  
a thermoelectric semiconductor group having N type thermoelectric semiconductors and P type thermoelectric semiconductors arranged along said support member;

heat absorbing electrodes joined to one end part of said  
20 thermoelectric semiconductor group;

heat radiating electrodes joined to the other end part of said thermoelectric semiconductor group so that at least parts of said N type thermoelectric semiconductors and said P type thermoelectric semiconductors are alternately connected in series;

25 and

first heat transmitting members integrally provided to said heat radiating electrodes, and provided to protrude to a radiation space; and

second heat transmitting members integrally provided to said heat absorbing electrodes, and provided to protrude to said radiation space in a same direction as said first heat transmitting members.

7. A thermoelectric element according to claim 6,  
5 wherein said support member is constituted of an electrical insulator, and is a heat absorbing support member constituting a contact part with an object to be cooled.

8. A thermoelectric element according to claim 7,  
wherein said second heat transmitting members function as  
10 a heat radiating medium for dissipating heat of said object to be cooled into said radiation space when said thermoelectric element is not in operation.

9. A thermoelectric element according to claim 6, further comprising:

15 a heat absorbing member connected to end portions at an opposite side from said heat absorbing electrodes, of said second heat transmitting members to be capable of transmitting heat,

wherein said heat absorbing member constitutes a contact part with an object to be cooled.

20 10. A thermoelectric element according to claim 9,  
wherein said second heat transmitting members have a function as a heat transmitting medium from said heat absorbing member to said heat absorbing electrode, and a function as a heat radiating medium from said heat absorbing member to said heat radiation space.

25 11. A thermoelectric element according to claim 10,  
wherein said second heat transmitting members function as a heat radiating medium for dissipating heat of said object to be cooled into said radiation space when said thermoelectric element

is not in operation.

12. A thermoelectric element, comprising:

a support member;

a thermoelectric semiconductor group having N type

5 thermoelectric semiconductors and P type thermoelectric semiconductors arranged along said support member;

heat absorbing electrodes joined to one end part of said thermoelectric semiconductor group;

10 heat radiating electrodes joined to the other end part of said thermoelectric semiconductor group so that at least parts of said N type thermoelectric semiconductors and said P type thermoelectric semiconductors are alternately connected in series;

first heat transmitting members integrally provided to said heat radiating electrodes, and provided to protrude outside said  
15 heat radiating electrodes to be located at a first radiation space; and

second heat transmitting members integrally provided to said heat absorbing electrodes, and provided to protrude outside said heat absorbing electrodes to be located in a second radiation space;  
20 and

a heat absorbing member connected to end portions at an opposite side from said heat absorbing electrodes, of said second heat transmitting members to be capable of transmitting heat, and constituting a contact part with an object to be cooled.

25 13. A thermoelectric element according to claim 12,

wherein said second heat transmitting members have a function as a heat transmitting medium from said heat absorbing member to said heat absorbing electrode, and a function as a heat radiating

medium from said heat absorbing member to said second heat radiation space.

14. A thermoelectric element according to claim 13,  
wherein said second heat transmitting members function as  
5 a heat radiating medium for dissipating heat of said object to be cooled into said second radiation space when said thermoelectric element is not in operation.

15. An electronic component module, comprising:  
a component to be cooled; and  
10 a thermoelectric element according to claim 1 mounted on said component to be cooled.

16. An electronic component module, comprising:  
a component to be cooled; and  
a thermoelectric element according to claim 7 mounted on said  
15 component to be cooled so that said component to be cooled and said heat absorbing support member are in contact with each other.

17. A portable electronic apparatus, comprising an electronic component module according to claim 15.

18. A portable electronic apparatus, comprising an  
20 electronic component module according to claim 16.